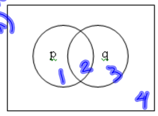
2-2 Logic
Continued

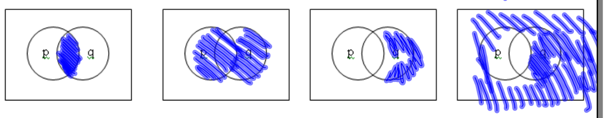
Venn Diagrams

Oct 1-7:30 AM

Venn Diagrams
∧-- AND intersection (common)
∨-- OR union (all)



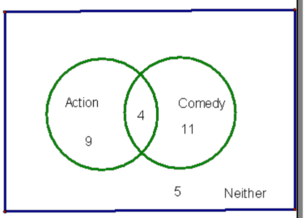
p ∧ q 12 23 | p ∨ q 12 23 | ~p ∧ q 34 23 | ~p ∨ q 34 23



Oct 1-9:18 AM

Use the Venn diagram to answer the following questions.

Jack surveyed the students in his science class to find out what movies they preferred.



1. 29 How many students were surveyed? 9+4+11+5

2. 13 How many students preferred Action? 9+4

3. 4 How many students preferred Action and Comedy?

4. 14 How many students did not prefer comedy? 5+9

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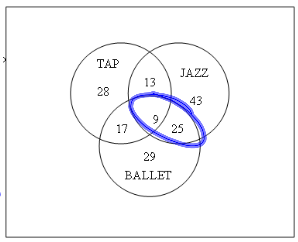
Use the following Venn diagram about dance classes to answer the questions.



1. 9 How many students are in tap, jazz, and ballet?

2. 121 How many are in tap or ballet? 28+13+17+9+29+25

3. 25 How many are in jazz and ballet and not tap?

4. 34 How many are in jazz and ballet? 25+9

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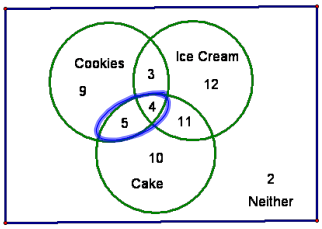
Use the following Venn diagram about dessert preferences to answer the questions.



1. 54 How many people were surveyed?
2. 21 How many people preferred cookies? 9+5+4+3
3. 9 How many people preferred cookies and cake? 5+4
4. 26 How many people did not prefer ice cream? 9+5+10+2
5. 45 How many people preferred cake or ice cream? 12+3+4+11+5+10
6. 4 How many people preferred cookies and cake and ice cream?

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2-3 Conditional Statements

Conditional statements are statements written in the *if, then* form.

If p, then q. p-hypothesis q-conclusion

$p \rightarrow q$ "if p, then q" or "p implies q"

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Examples:

If Cinderella completes her chores, then she can go to the ball.

If an angle is a right angle, then it measures 90°.

If a polygon has exactly 6 sides, then it is a hexagon.

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Examples:

All squares are rectangles.

If it is a square, then it is a rectangle.

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All cats are animals.

If it is a cat, then it is an animal.

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Related conditionals

Conditional	$p \to q$
Converse	$q \to p$
Inverse	$\sim p \to \sim q$
Contrapositive	$\sim q \to \sim p$

→ negates the original
→ negates the converse

If a conditional is true, then the contrapositive must also be true. They are said to be _____. The same is true for the converse and the inverse.

logically equivalent

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Example: Put the following statement into the if, then form. Write each related conditional. Determine whether it is True or False. If false, provide a counterexample.

Example:

All birds are owls.

Conditional: F

If it is a bird then it is an owl.

Cardinal

Converse:

If it is an owl, then it is a bird. T

Inverse: T

If it is not a bird, then it is not an owl.

Contrapositive:

If it is not an owl, then it is not a bird. F

cardinal

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Example: Write each related conditional. Determine whether it is True or False. If false, provide a counterexample.

Cond. T

If two angles form a linear pair, then they are adjacent angles.

Converse: If 2 ∠s are adjacent, then they form a L.P. False

Inverse: If 2 ∠s do not form a L.P., then they are not adj. False

Contrapositive: If 2 ∠s are not adj, then they do not form a L.P. T

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Assignment: p. 72-73 #s 15-17, 41-47, 51
p. 78-79 #s 16, 17, 23, 25, 26, 34-39, 43

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